

Wheels and Tires -

Wheels

Wheel type	Wheel size
Alloy wheel	7J x 17
Alloy wheel	8J x 18
Alloy wheel	8J x 19
Alloy wheel	8.5J x 20
Reduced size spare wheel - Steel	5.5J x 19

• CAUTIONS:



With reduced size spare wheel fitted, do not exceed 50 mph (80 kph) and replace with standard size wheel at earliest opportunity.



Do not use power tools when operating the spare wheel winch, raise and lower winch manually using hand tools only.

Tire Sizes - Standard Fit

Wheel size	Tire size	Tire load index
7J x 17 - Alloy	235/70 R17H - All terrain	111
8J x 18 - Alloy	255/60 R18V - All terrain	112
8J x 19 - Alloy	255/55 R19V - All terrain	111
8.5J x 20 - Alloy	255/50 R20Y - All terrain	109



CAUTION: Inner tubes must not be fitted with any of these tires.

Tire Sizes - Accessory Fit

Wheel size	Tire size	Tire load index
8J x 19 - Alloy	255/55 R19 - Mud terrain	111
8J x 19 - Alloy	255/55 R19 - Sand	111



CAUTION: Inner tubes must not be fitted with any of these tires.

Tire Pressures - Not NAS / Gulf / Brazil Vehicles

Loading condition	bars	lbf / in ²	kPa
Normal operating conditions - Up to 4 people:			
Front	2.3	33	230
Rear	2.5	36	250
Vehicle loaded to maximum gross vehicle weight:			
Front	2.5	36	250
Rear	2.9	42	290
Reduced size spare wheel	4.2	60	420
* Standard size spare wheel	2.9	42	290



CAUTION: * The standard size spare wheel tire should be inflated to the maximum gross vehicle weight pressure and the pressure for the front or rear wheel locations must be adjusted accordingly if the wheel is to be used under conditions other than with the vehicle loaded to maximum gross vehicle weight.

Tire Pressures - NAS / Gulf / Brazil Vehicles

Loading condition	bars	lbf / in ²	kPa
All conditions			
Front	2.5	36	250
Rear	2.9	42	290
Reduced size spare wheel	4.2	60	420
* Standard size spare wheel	2.9	42	290



CAUTION: The standard size spare tyre should be inflated to the highest recommended pressure when stored on the vehicle. The inflation pressure must be adjusted to suit the axle location when the spare is used to replace a punctured road tyre."

General Specification

Item	Make	Location
Tire low pressure sensor	Continental/Siemens	On inside of wheel rim
Tire pressure sensor initiator:		
Front	Continental/Siemens	Attached to the fender splash shield adjacent to the front bumper
Rear	Continental/Siemens	Attached to the fender splash shield adjacent to the rear bumper

Recommended Lubricant

Application	Land Rover Part No.
Wheel hub spigot	RYL 105020

Torque Specifications

Description	Nm	lb - ft
* Road wheel nuts	140	103
Tire low pressure sensor	8	6

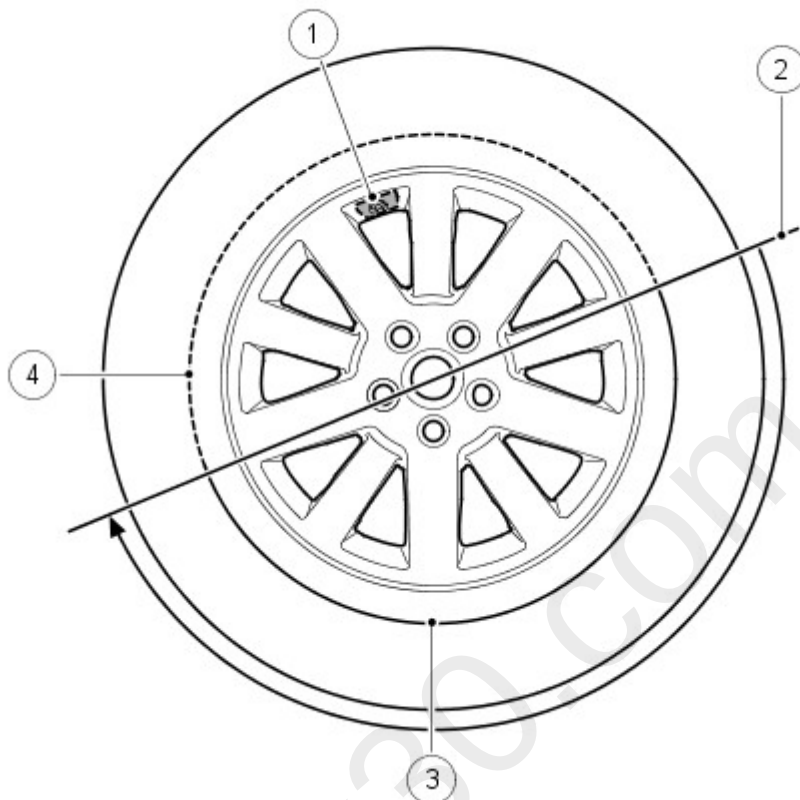
* Wheel nuts must be tightened by diagonal selection

Wheels and Tires - Wheels and Tires

Description and Operation

TIRES

Care must be taken when removing and refitting tires to ensure that the tire pressure sensor is not damaged.



E45549

Item	Part Number	Description
1	-	Tire valve and pressure sensor
2	-	Tire fitting/removal tool initial start position
3	-	High tire and bead tension area
4	-	Low tire and bead tension area

When removing the tire, the bead breaker must not be used within 90 degrees of the tire valve in each direction.

When using the tire removal machine, the fitting arm start position must be positioned as shown in the tire changing illustration. The wheel can then be rotated through 180 degrees in a counterclockwise direction. This will relieve the high tension from the tire bead allowing the remaining 180 degrees of the tire to be manually pulled from the rim.

When refitting the tire, position the fitting arm as shown. Rotate the tire and take care that the bead on the low tension side of the tire does not damage the sensor.

Tread Act - NAS Only

Vehicles supplied to the North American markets must comply with the legislation of the Transport Recall Enhancement, Accountability and Documentation (TREAD) act. Part of the requirement of the TREAD act is for the vehicle to display a label, positioned on the driver's side B-pillar, which defines the recommended tire inflation pressure, load limits and maximum load of passengers and luggage weight the vehicle can safely carry. This label will be specific to each individual vehicle and will be installed on the production line.

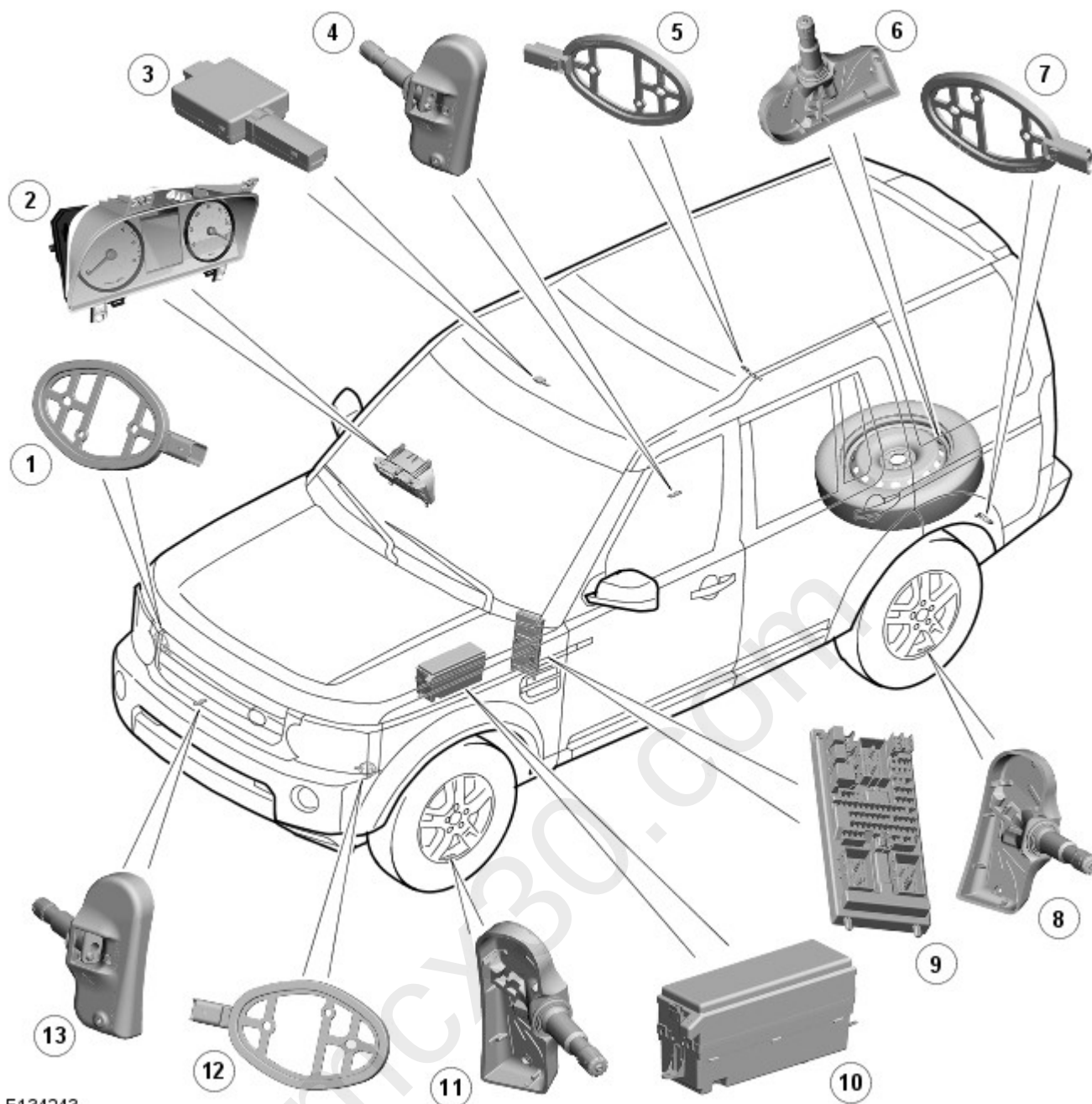
This label must not be removed from the vehicle. The label information will only define the specification of the vehicle as it came off the production line. It will not include dealer or owner fitted accessory wheels and tires of differing size from the original fitment.

• **NOTE:** If tires and wheels of a non-standard size are fitted to the vehicle, the car configuration file must be updated using a Land Rover approved diagnostic system.

If the label is damaged or removed for body repair, it must be replaced with a new label specific to that vehicle. A new label is requested from Land Rover parts and will be printed specifically for the supplied VIN of the vehicle.

TIRE PRESSURE MONITORING SYSTEM (TPMS)

Tire Pressure Monitoring System - Component Location



E134243

Item	Part Number	Description
1	-	RH (right-hand) front initiator
2	-	Instrument cluster
3	-	TPMS RF receiver
4	-	RH rear tire pressure sensor
5	-	RH rear initiator
6	-	Spare tire pressure sensor
7	-	LH (left-hand) rear initiator
8	-	LH rear tire pressure sensor
9	-	CJB (central junction box)
10	-	EJB (engine junction box)
11	-	LH front tire pressure sensor
12	-	LH front initiator
13	-	RH front tire pressure sensor

The purpose of the Tire Pressure Monitoring System (TPMS) is to assist the driver in maintaining the vehicle's tire pressures at the optimum level in order to:

- improve fuel consumption
- maintain ride and handling characteristics
- reduce the risk of rapid tire deflation – which may be caused by under inflated tires
- comply with legislation in relevant markets.

The TPMS measures the pressure in each of the tires on the vehicle (including the spare, if required) and issues warnings to the driver if any of the pressures deviate from defined tolerances.

• **NOTE:** During a 'blow out' a very rapid reduction in pressure is experienced. The system is not intended to warn the driver of a 'blow out', since it is not possible to give the driver sufficient warning that such an event is occurring, due to its

short duration. The design of the TPMS is to assist the driver in keeping the tires at the correct pressure, which will tend to reduce the likelihood of a tire 'blow out' occurring.

• **NOTE:** TPMS is inhibited when the vehicle is in Delivery mode. For more details on Delivery mode refer to the PDI manual.

A single TPMS hardware configuration is used. TPMS status information is relayed to the driver with a message displayed in the instrument cluster message center and a amber warning indicator.

Tire Location

Because of the requirement for different pressure targets and thresholds for the front and rear tires, the [CJB](#) can identify the location of the tires on the vehicle, and assign a received tire pressure sensor identification to a specific position on the vehicle (i.e. FL (front left), FR (front right), RL (rear left) or RR (rear right)).

Tire location is performed automatically by the [CJB](#) using an auto-location function. This function requires no manual intervention by the driver. The [CJB](#) can automatically learn the position of tires on the vehicle if the tire pressure sensors or their positions are changed on the vehicle.

The tire learn and location process is ready to commence when the vehicle has been stationary or is traveling at less than 12 mph (20 km/h) for 15 minutes. This is known as 'parking mode'. The learn/locate process requires the vehicle to be driven at speeds of more than 12 mph (20 km/h) for 15 minutes. If the vehicle speed reduces to below 12 mph (20 km/h), the learn process timer is suspended until the vehicle speed increases to more than 12 mph (20 km/h), after which time the timer is resumed. If the vehicle speed remains below 12 mph (20 km/h) for more than 15 minutes, the timer is set to zero and process starts again.

The [CJB](#) can automatically detect, under all operating conditions, the following:

- one or more tire pressure sensors have been replaced
- one or more tire pressure sensor identifications are missing
- one or more 'alien' identifications are being received, i.e. the [CJB](#) can reject identifications from tire pressure sensors that do not belong to the vehicle
- the spare tire and one of the tires in use on the vehicle have exchanged position on the vehicle.

If the tire pressure sensors fitted to the running wheels (not the spare) are changed, the [CJB](#) can learn the new sensor identifications automatically. The learn function requires no manual intervention by the driver.

If a new sensor is fitted to the spare tire it must have its identification code programmed into the [CJB](#) using a Land Rover approved diagnostic system, or used on the vehicle as a 'running' wheel and the vehicle driven for 15 minutes at more than 12.5 mph (20 km/h).

Spare Tire Identification

Depending on the vehicle specification, the spare tire may or may not be fitted with a tire pressure sensor.

• **NOTE:** Tire pressure sensors cannot be fitted to steel space saver spare wheels.

If the spare tire is fitted with a tire pressure sensor, the [CJB](#) can detect it, determine that it is the spare tire and monitor its pressure and issue warnings to the driver accordingly. If the [CJB](#) expects the spare tire to be fitted with a tire pressure sensor and it does not, the [CJB](#) will not show a fault to the driver, however a fault code will be stored in the [CJB](#).

If the spare tire is being monitored and the driver replaces a flat 'running' tire with the spare tire, the [CJB](#) will not continually warn the driver that the original flat tire (now in the spare position) is flat. This prevents distraction of the driver by constant pressure warnings being issued. The driver is reminded by a message displayed for 20 seconds at each ignition on cycle that the spare tire is flat.

System Operation

Each time the vehicle is driven, the [CJB](#) transmits a Low Frequency (LF) (125 KHz) signal to each initiator in turn. This is received by the tire pressure sensor which transmits a Radio Frequency (RF) (315 or 433 MHz depending on market) signal to the RF receiver. This signal contains coded data which corresponds to sensor identification, air pressure, air temperature and acceleration data. This signal is communicated to the [CJB](#) via a K-bus line.

The system enters 'parking mode' after the vehicle speed has been less than 12.5 mph (20 km/h) for 12 minutes. In parking mode the tire pressure sensors transmit a coded signal to the [CJB](#) once every 13 hours. If the tire pressure decreases by more than 1 lbf/in² (0.6 bar) the sensor will transmit more often if pressure is being lost.

The spare tire sensor transmits a signal every 13 hours in the same manner as the road wheels when in parking mode. If the tire pressure decreases by more than 1 lbf/in² (0.6 bar) the sensor will transmit more often if pressure is being lost.

As each wheel responds to the LF signal from the [CJB](#), it is assigned a position on the vehicle and is monitored for the remainder of that drive cycle in that position.

When the vehicle has been parked for more than 15 minutes and then driven at a speed of more than 12.5 mph (20 km/h), the initiators fire in turn for 18 seconds in the following order:

- Front left
- 6 second pause (for the to detect a response from the tire pressure sensor)
- Front right
- 6 second pause
- Rear right
- 6 second pause
- Rear left
- 6 second pause.

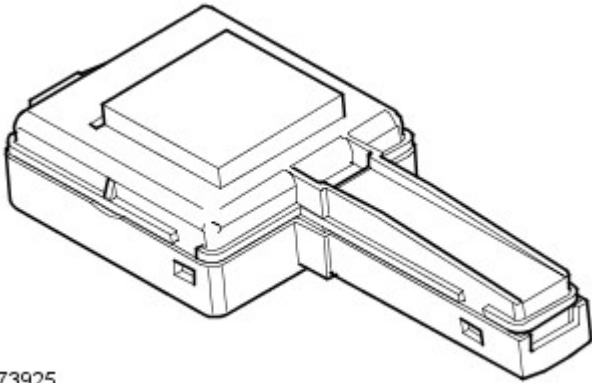
Each tire pressure sensor responds in turn so the [CJB](#) can establish the sensor positions at the start of the drive cycle.

This process is repeated up to three times but less if the sensor positions are already known in the [CJB](#). The process is known as 'Auto Location' and takes 7 to 8 minutes to complete. During this period the tire sensors transmit at regular intervals, once every 15 seconds. For the remainder of the drive cycle the tire sensors transmit once every 60 seconds or if a change in tire pressure is sensed until the vehicle stops and the system returns to parking mode.

Once the wheel position is established, the initiators stop firing a signal and do not fire again until the vehicle has been parked for more than 15 minutes. The signal transmissions from each wheel sensor continue at 1 minute intervals whilst the vehicle is being driven. This transmission is to monitor the tire pressure.

At 25% deflation the amber warning indicator in the instrument cluster is illuminated and an appropriate message displayed in the message center.

RF Receiver

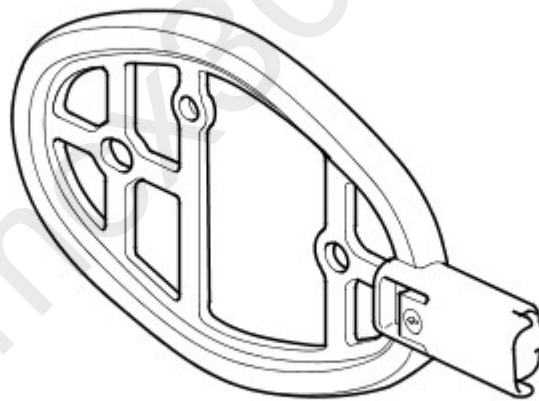


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The RF receiver is mounted behind the overhead console and connects to the vehicle harness via a fly lead.

The RF receiver receives transmissions from each of the tire pressure sensors via an internal antenna. This information is then communicated to the [CJB](#) via a dedicated Local Interconnect Network (K-bus).

Initiator



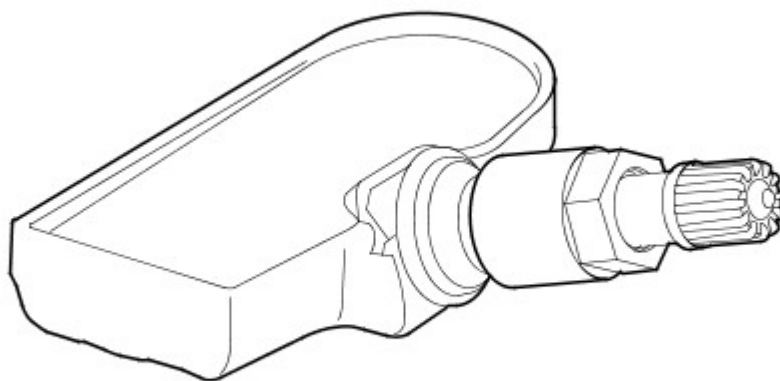
E45552

The initiators are located at the front of the front wheel arches and at the rear of the rear wheel arches and are secured with two scrivenets. The TPMS has four initiators and each has a connector which connects with the body harness.

The initiator is a passive, Low Frequency (LF) transmitter. Each initiator provides an auto-location feature to identify tire positions on the vehicle and transmit that data to the [CJB](#).

The [CJB](#) energizes each initiator in turn using LF drivers. The corresponding tire pressure sensor detects the resulting LF transmission and responds by initiating an RF transmission of its data. This data is received by the RF receiver and communicated to the [CJB](#) via a K-bus. The [CJB](#) can then determine which sensor is transmitting and its location on the vehicle.

Tire Pressure Sensor



E45553

The TPMS system uses 'active' tire pressure sensors which are mounted on each wheel, inside the tire cavity. The sensor is retained in position by the valve attachment to the wheel structure. The sensors transmit their RF signals at either 315 MHz or 433 MHz dependent on market requirements.

The sensors periodically measure the pressure and temperature of the air inside the tire plus the centripetal acceleration acting on the sensor. These measurements are transmitted periodically to the RF receiver located behind the overhead console.

The tire pressure sensors are self-contained units which have no electrical connections into or out of the sensor.

The care points detailed in the 'Tires' section of this chapter must be followed to avoid damage to the sensor. If the sensor is replaced, the nut, seal and washer must also be replaced and the sensor tightened to the correct torque value as given in the Service Repair manual.

The RF transmission from the sensor contains a unique identification code in its transmission data, so that the [CJB](#) can identify the tire on the vehicle. If the sensor is replaced on a 'running' wheel, the new sensor identification will be learnt when the vehicle is first driven at a speed of more than 12.5 mph (20 km/h) for 15 minutes. If a new sensor is fitted to the spare wheel, the identification for that sensor must be programmed into the [CJB](#) using a Land Rover approved diagnostic system or that wheel will not be monitored. The code is provided on a label with the complete wheel and tire assembly when new and is also printed on the casing of each sensor.

The replacement spare wheel may also be programmed to the vehicle by using it as a 'running' wheel for 15 minutes at more than 12.5 mph (20 km/h), then replacing it to the spare wheel position.

In order to conserve battery power, the tire sensor module uses different transmission rates when the wheel is stationary or moving. The wheel speed required to change between the stationary and moving transmission rates is very low to allow for the requirement for slow off-road driving.

Instrument Cluster Indications



E134246

Item	Part Number	Description
1	-	Message center
2	-	Amber warning indicator

The warning indications to the driver are common on all vehicles fitted with TPMS. Warnings are conveyed by an amber light emitting diode (LED) warning indicator and a text message displayed in the message center.

The warning indicator and message center are driven by CAN messages from the [CJB](#). The warning indicator is illuminated by the cluster software for 3 seconds when the vehicle is in power mode 6 for a bulb check.

For additional information, refer to: [Information and Message Center](#) (413-08 Information and Message Center, Description and Operation).

Controller Area Network (CAN)

The [CJB](#) sends and receives a number of digital messages via the medium speed controller area network (CAN). The received messages are used for the operation of the TPMS. The transmitted messages comprise of TPMS status and requests to the instrument cluster to illuminate warnings indicators and/or display messages in the message center.

Transmitted Messages

The [CJB](#) transmits the messages shown in the following table.

Message	Received By
TPMS diagnostic response	A Land Rover approved diagnostic system.
TPMS amber warning indicator request at 25% tire deflation	Instrument cluster
TPMS message display request	Instrument cluster

Diagnostics

The [CJB](#) has a diagnostic connection via the medium speed CAN to enable system status and faults to be retrieved using a Land Rover approved diagnostic system.

Additionally, an on-board diagnostic routine within the [CJB](#) constantly monitors the system and alerts the driver to system faults by illuminating the amber warning indicator and/or displaying a message in the instrument cluster message center.

Fault Detection

If a sensor fails, the amber warning indicator in the instrument cluster will be illuminated. A message 'XX Tyre Not Monitored' will be displayed in the message center in addition to the amber warning indicator.

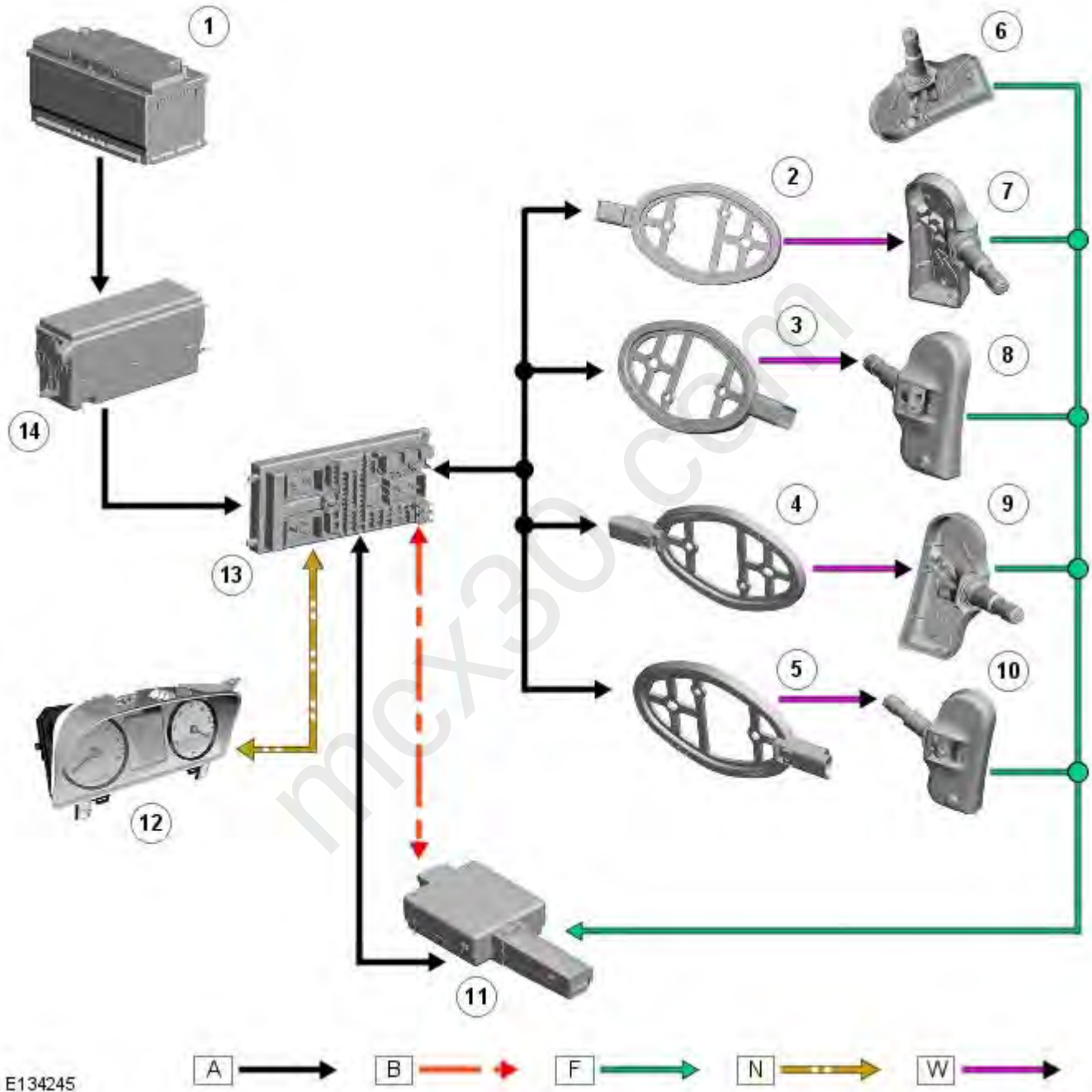
- **NOTE:** 'XX' is the tire position on the vehicle, e.g. FL (front left), FR (front right), RL (rear left) or RR (rear right).

If more than one sensor fails or the [CJB](#) develops a fault, the amber warning indicator will be illuminated. A message 'Tyre Monitoring System Fault' will be displayed in the message center in addition to the amber warning indicator. This fault could also be caused if RF interference near the vehicle affects the system signal reception. When the interference has ceased, the fault will be automatically cancelled and the TPMS will operate normally.

If a tire pressure sensor battery voltage becomes low, the sensor transmits a message to the [CJB](#). The [CJB](#) stores the low battery condition as a fault flag in its memory with no other visual warnings displayed. If the battery fails, the sensor will stop transmitting and the [CJB](#) will transmit a message to display 'FL Tyre Not Monitored' for example in the message center. The dealer should interrogate the [CJB](#) for the fault flag using a Land Rover approved diagnostic system to determine the cause of the message. If the battery has failed, the sensor must be replaced and the stored fault flags removed using a Land Rover approved diagnostic system. The [CJB](#) will learn the identification of the new sensor when the vehicle is driven. If the replaced sensor is fitted to the spare wheel (if fitted), its identification must be manually programmed into the [CJB](#) using a Land Rover approved diagnostic system or by using it as a 'running' wheel for 15 minutes at more than 12.5 mph (20 km/h), then replacing it to the spare wheel position.

CONTROL DIAGRAM

• NOTE: **A** = Hardwired; **B** = K-Bus; **F** = RF Transmission; **N** = Medium Speed CAN Bus; **W** = LF Transmission



E134245

Item	Part Number	Description
1	-	Battery
2	-	RH rear initiator
3	-	LH rear initiator
4	-	RH front initiator
5	-	LH front initiator
6	-	Spare tire pressure sensor
7	-	RH rear tire pressure sensor
8	-	LH rear tire pressure sensor
9	-	RH front tire pressure sensor
10	-	LH front tire pressure sensor
11	-	TPMS RF receiver

12	-	Instrument Cluster
13	-	CJB
14	-	EJB

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Wheels and Tires - Wheels and Tires

Diagnosis and Testing

Principles of Operation

For a detailed description of the wheels and tires, refer to the relevant Description and Operation section in the workshop manual.

REFER to: [Wheels and Tires](#) (204-04 Wheels and Tires, Description and Operation) / [Wheels and Tires](#) (204-04, Description and Operation).

Inspection and Verification



CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

1. **1. Verify the customer complaint.** As much information as possible should be gathered from the driver to assist in diagnosing the cause(s). Confirm which of the following two warning types (A or B) exist for the Tire Pressure Monitoring System when the ignition status is switched from 'OFF' to 'ON'
 - **(A) Check Tire Pressure Warnings.** A low tire pressure warning will **continuously** illuminate the low tire pressure warning lamp. This warning may be accompanied by a text message such as CHECK TIRE PRESSURE (refer to owner literature). The manufacturer approved diagnostic system does NOT need to be used. Diagnostic Trouble Codes (DTCs) are not generated with this type of warning. To extinguish this warning it is essential that, with the ignition 'ON', all vehicle tires (including the spare) are to be set to the correct pressure as stated in the vehicle handbook or as indicated on the placard label in the passenger/driver door aperture. **It is not necessary to drive the vehicle to clear 'check tire pressure' warnings - just changing the tire pressure causes the tire low pressure sensor to transmit new data.**
 - **NOTE:** The tire pressures should be set by:
 - Using a calibrated tire pressure gauge
 - With 'cold' tires (vehicle parked in the ambient temperature for at least one hour, not in a garage with an artificial ambient temperature)
 - **NOTE:** If the tire pressure warning does not clear within two minutes, it is likely that the gauge is not correctly calibrated or the tires are 'warm'. Carry out the following steps until the warning has cleared:
 - Rotate wheels approximately 180 degrees
 - Increase the tire pressures by 3psi
 - Wait a further two minutes
 - When the tires are at ambient temperature and a **calibrated** gauge is available, reset the tire pressures to the correct pressure.
 - **NOTE:** Tire pressure adjustments are part of routine owner maintenance. Tire pressure adjustments that are required due to a lack of owner maintenance are not to be claimed under vehicle warranty.
 - **(B) System Fault Warnings.** When a system fault is detected, the low tire pressure warning lamp will flash for approximately 75 seconds prior to being continuously illuminated. Visually inspect wheel arch Tire Pressure Monitoring System Antennas and check for system DTCs. External visual damage to the tire low pressure sensors and air leaks will not cause system fault warnings (note: nut and seal system should be replaced at each tyre change using the available service kit). Check for the presence of tire low pressure sensors on all four wheels (note: a tire low pressure sensor has a metal valve stem rather than a rubber one).
2. **2. Check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.**

DTC Index

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.

REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Central Junction Box \(CJB\)](#) (100-00 General Information, Description and Operation).

Pinpoint Tests

PINPOINT TEST A : U201F11 TIRE PRESSURE MONITORING SYSTEM EXTERNAL RECEIVER DATA LINE CIRCUIT SHORT TO GROUND		
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS	
A1: U201F11 VERIFY EXTERNAL RECEIVER DATA LINE CIRCUIT SHORT TO GROUND		
	1	Ignition OFF.
	2	Disconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875.
	3	Measure the resistance between
	C2875, harness side	Battery
	Pin 1	Negative terminal
	Is the resistance less than 5 Ohms?	
	Yes	
	GO to A2.	
	No	
	GO to A3.	
A2: U201F11 CHECK THE EXTERNAL RECEIVER DATA LINE CIRCUIT FOR SHORT CIRCUIT TO GROUND		
	1	Disconnect the Body Control Module electrical connector, C0580.

	2	Measure the resistance between	
		C2875, harness side	Battery
		Pin 1	Negative terminal
		Is the resistance less than 5 Ohms?	
		Yes REPAIR the short circuit in wiring harness.	
		No GO to A4.	
A3: U201F11 CHECK THE TIRE PRESSURE MONITORING SYSTEM EXTERNAL RECEIVER FOR SHORT CIRCUIT TO GROUND			
	1	Reconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875.	
	2	Using manufacturer approved diagnostic system run On Demand Self Test (0x0202) .	
		Is the DTC U201F11 set?	
		Yes Replace Tire Pressure Monitoring Receiver.	
		No Investigate possible cause of intermittent failure.	
A4: U201F11 CHECK THE BODY CONTROL MODULE FOR SHORT CIRCUIT TO GROUND			
	1	Reconnect the Body Control Module electrical connector, C0580.	
	2	Reconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875.	
	3	Using manufacturer approved diagnostic system run On Demand Self Test (0x0202) .	
		Is the DTC U201F11 set?	
		Yes Replace Body Control Module.	
		No Investigate possible cause of intermittent failure.	

PINPOINT TEST B : U201F12 TIRE PRESSURE MONITORING SYSTEM EXTERNAL RECEIVER DATA LINE CIRCUIT SHORT TO POWER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS	
B1: U201F12 VERIFY EXTERNAL RECEIVER DATA LINE CIRCUIT SHORT TO POWER		
	1	Ignition OFF.
	2	Disconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875.
	3	Measure the resistance between
	C2875, harness side	Battery
	Pin 1	Positive terminal
	Is the resistance less than 5 Ohms?	
	Yes GO to B2.	
	No GO to B3.	
B2: U201F12 CHECK THE EXTERNAL RECEIVER DATA LINE CIRCUIT FOR SHORT CIRCUIT TO POWER		
	1	Disconnect the Body Control Module electrical connector, C0580.
	2	Measure the resistance between
	C2875, harness side	Battery
	Pin 1	Positive terminal
	Is the resistance less than 5 Ohms?	
	Yes REPAIR the short circuit in wiring harness.	
	No GO to B4.	
B3: U201F12 CHECK THE TIRE PRESSURE MONITORING SYSTEM EXTERNAL RECEIVER FOR SHORT CIRCUIT TO POWER		
	1	Reconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875.
	2	Using manufacturer approved diagnostic system run On Demand Self Test (0x0202) .
	Is the DTC U201F12 set?	
	Yes Replace Tire Pressure Monitoring Receiver.	
	No Investigate possible cause of intermittent failure.	
B4: U201F12 CHECK THE BODY CONTROL MODULE FOR SHORT CIRCUIT TO POWER		
	1	Reconnect the Body Control Module electrical connector, C0580.
	2	Reconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875.
	3	Using manufacturer approved diagnostic system run On Demand Self Test (0x0202) .
	Is the DTC U201F12 set?	
	Yes Replace Body Control Module.	
	No Investigate possible cause of intermittent failure.	

PINPOINT TEST C : U201F87 TIRE PRESSURE MONITORING SYSTEM EXTERNAL RECEIVER DATA LINE MISSING MESSAGE

TEST CONDITIONS		DETAILS/RESULTS/ACTIONS	
C1: U201F87 VERIFY EXTERNAL RECEIVER DATA LINE MISSING MESSAGE			
	1	Using manufacturer approved diagnostic system run On Demand Self Test (0x0202).	

	Is the DTC U201F87 set? Yes GO to C2. No Investigate possible cause of intermittent failure.				
C2: U201F87 CHECK EXTERNAL RECEIVER DATA LINE CIRCUIT					
	1 Ignition OFF. 2 Disconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875. 3 Disconnect the Body Control Module electrical connector, C0580. 4 Measure the resistance between <table border="1"> <tr> <th>C2875, harness side</th><th>C0580, harness side</th></tr> <tr> <td>Pin 1</td><td>Pin 25</td></tr> </table>	C2875, harness side	C0580, harness side	Pin 1	Pin 25
C2875, harness side	C0580, harness side				
Pin 1	Pin 25				
	Is the resistance less than 5 ohms? Yes GO to C3. No REPAIR the high resistance/open circuit in wiring harness.				
C3: U201F87 CHECK EXTERNAL RECEIVER					
	1 Reconnect the Body Control Module electrical connector, C0580. 2 Reconnect the Tire Pressure Monitoring System Receiver electrical connector, C2875. 3 Using manufacturer approved diagnostic system run On Demand Self Test (0x0202).				
	Is the DTC U201F87 set? Yes Replace Tire Pressure Monitoring Receiver. GO to C4. No Investigate possible cause of intermittent failure.				
C4: U201F87 CHECK BODY CONTROL MODULE.					
	1 Using manufacturer approved diagnostic system run On Demand Self Test (0x0202).				
	Is the DTC U201F87 set? Yes Replace Body Control Module. No Test is complete. No further action is required.				

PINPOINT TEST D : C1A5693, C1A5893, C1A6093, C1A6293 DEFECTIVE RUNNING TIRE LOW PRESSURE SENSOR OR RECEIVER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
D1: C1A5693, C1A5893, C1A6093, C1A6293 CHECK FOR ADDITIONAL DTCS	
	1 Using manufacturer approved diagnostic system check for additional DTCs C1A5693, C1A5893, C1A6093, C1A6293, with identical time stamps.
	Have all four DTCs logged with identical time stamps in the Body Control module? Yes Diagnose and fix DTCs related to the tire pressure monitoring receiver. No Using manufacturer approved diagnostic system, perform diagnostic routine to verify reception of all tire low pressure sensors, by carrying out 'TPMS wheel unit & receiver reception test' from set up and configuration application and complete remedial actions.

PINPOINT TEST E : C1D1800 LOCALIZATION FAILURE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: C1D1800 ESTABLISH THE LOCATIONS OF THE TIRE LOW PRESSURE SENSOR LOCALIZATION FAILURES	
	• NOTE: To clear or reset information read in datalogger signal 'Unsuccessful wheel position triggering statistic' (0x4149) Use manufacturer approved diagnostic system and carry out 'Reset/ Clear Specified Function' (0x040E) from Special Applications. 1 Using manufacturer approved diagnostic system read datalogger signal 'Unsuccessful wheel position triggering statistic' (0x4149) to establish the locations of the tire low pressure sensor localization failures.
	Have the locations of the tire low pressure sensor localization failures been identified? Yes GO to E2. No Investigate possible cause of intermittent failure.
E2: C1D1800 CHECK FOR ADDITIONAL LF INITIATOR CIRCUIT DTCS	
	1 Using manufacturer approved diagnostic system check for additional DTCs C1A5712, C1A5714, C1A5912, C1A5914, C1A6112, C1A6114, C1A6312, C1A6314.
	Are any of the following DTCs logged C1A5712, C1A5714, C1A5912, C1A5914, C1A6112, C1A6114, C1A6312, C1A6314? Yes Refer to the DTC Index. Check for possible causes for each of the logged DTCs and carry out the repair operations specified. No GO to E3.
E3: C1D1800 CHECK FOR ADDITIONAL TIRE LOW PRESSURE SENSOR DTCS	
	1 Using manufacturer approved diagnostic system check for additional DTCs C1A5693, C1A5893, C1A6093, C1A6293, C1D2105.

	Are any of the following DTCs logged C1A5693, C1A5893, C1A6093, C1A6293, C1D2105? Yes Refer to the DTC Index. Check for possible causes for each of the logged DTCs and carry out the repair operations specified. No GO to E4.
E4: C1D1800 CHECK INITIATORS ARE CORRECTLY INSTALLED	
	1 Check for correct installation of Initiators for the locations identified. REFER to: (204-04 Wheels and Tires) Tire Pressure Monitoring System (TPMS) Front Antenna (Removal and Installation), Tire Pressure Monitoring System (TPMS) Rear Antenna (Removal and Installation).
	Are the Initiators correctly installed? Yes GO to E5. No Install Initiators to the correct locations.
E5: C1D1800 CHECK FOR SHORT CIRCUIT IN INITIATOR HARNESS	
	1 Ignition OFF.
	2 Disconnect the Body Control Module electrical connector, C0584 (Front LF Initiators).
	3 Disconnect the Body Control Module electrical connector, C0586 (Rear LF Initiators).
	4 Measure the resistance of Front Right Hand Initiator.
	C0584, harness side
	Pin 1
	C0584, harness side
	Pin 2
	5 Measure the resistance of Front Left Hand Initiator.
	C0584, harness side
	Pin 14
	C0584, harness side
	Pin 15
	6 Measure the resistance of Rear Right Hand Initiator.
	C0586, harness side
	Pin 30
	C0586, harness side
	Pin 31
	7 Measure the resistance of Rear Left Hand Initiator.
	C0586, harness side
	Pin 18
	C0586, harness side
	Pin 19
	Are any of the Initiator resistance measurements less than 1 Ohm? Yes REPAIR the short circuit as required. No Install the correct tire low pressure sensor, of correct frequency, in accordance with that defined in the manufacturer approved diagnostic system new tire low pressure sensor application, to the position(s) identified. REFER to: Tire Low Pressure Sensor (204-04 Wheels and Tires, Removal and Installation).

PINPOINT TEST F : C1D2105 MISSING, INCOMPATIBLE OR DEFECTIVE RUNNING TIRE LOW PRESSURE SENSOR(S) OR RECEIVER

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
F1: C1D2105 CHECK FOR CORRECT WHEEL AND TIRE ASSEMBLY AND TIRE LOW PRESSURE SENSORS	
	NOTE: As a visual check, a tire low pressure sensor has a metal valve stem rather than a rubber one and cannot be installed to a mini or space saver spare wheel.
	1 Check that all full size running wheel and tire assemblies have tire low pressure sensors installed.
	Is a full size wheel and tire assembly with tire low pressure sensor installed to all running wheel positions? Yes Using manufacturer approved diagnostic system, perform diagnostic routine to verify reception of all tire low pressure sensors, by carrying out 'TPMS wheel unit & receiver reception test' from set up and configuration application and complete remedial actions. No If agreed with the customer, install the correct wheel and tire assembly or tire low pressure sensor(s), of correct frequency, in accordance with that defined in the manufacturer approved diagnostic system new tire low pressure sensor application. (Note: If the datalogger signal 'Number Of Missing Tire Pressure Wheel Units' is 4 and the Instrument Panel Cluster displays text message 'Tire Pressure Monitoring Unavailable', the system has detected winter tire installation, as detailed in the owner's manual. Confirm why the vehicle has non-TPMS wheel & tire assemblies installed before installing tire low pressure sensors, which are not to be claimed under vehicle warranty.)

Component Tests

Wheels and Tires

For wheel and tire specification information (pressures, torques, etc).
REFER to: [Specifications](#) (204-04 Wheels and Tires, Specifications).

When replacing wheels or tires, local legislation regarding health and safety must be complied with.

If the vehicle has a Tire Pressure Monitoring System installed, only manufacturer approved wheels and tires should be used. If the wheel and tire size is changed (for example from R18 to R20) the Tire Pressure Monitoring System module should be updated with the correct pressure information appropriate to the new wheel and tire set. Update the Tire Pressure Monitoring System module using the manufacturer approved diagnostic system.

As a general guideline, only replace tires in pairs or as a set, and only with tires of equivalent size and specification.

Confirm the symptoms of the customer complaint.

As much information as possible should be gathered from the driver to assist in diagnosing the cause(s).

1. Before a road test, carry out a basic inspection to make sure the vehicle is safe and legal to drive.

Basic inspection

- Correct tire inflation.
REFER to: [Specifications](#) (204-04 Wheels and Tires, Specifications).
- Legal tire tread depth
- Cuts/Bulges in tire sidewall(s)
- Tire ply separation
- Embedded objects
- Wheel rim damage
- Correct tire installation (specification, direction of rotation, etc)
- Any obvious distortion of the tire (flat/high spots)
- Worn/Damaged steering or suspension components

Road test

If the results of the basic inspection are acceptable, carry out a road test to confirm the symptoms.

To reproduce the symptoms, test the vehicle on similar roads to those on which the fault occurs and at similar speeds (provided it is legal to do so).

If the vibration or noise can be reproduced, note the speed at which it occurs and see if it is possible to drive through the symptom, meaning, is it possible to alter the fault by driving faster or slower than the speed at which it occurs?

If it **is** possible, it is likely that the fault is caused by an imbalance in the wheel or tire.

If the vibration or noise gets worse as the vehicle speed increases, it is likely that the fault is caused by distortion in the wheel or tire, or worn or damaged components.

Distortion checks

Check for distortion by raising the vehicle so that the wheels are free and placing an axle stand or similar fixed object next to each wheel in turn.

If the stand is placed at the tread of the tire, the tire can be checked for ovality by turning the wheel by hand and checking for high or low spots where the gap between the tread and the stand increases or reduces.

If the stand is placed next to the wheel rim or tire sidewall, the wheel and tire can be checked for run-out in a similar way.

Wheels and Tires - Tire Low Pressure Sensor

Removal and Installation

Removal

• **NOTE:** It is strongly recommended that the valve seal and steel washer is replaced each time a tire is changed to avoid a seal failure. The seal and washer must be replaced if the sensor is removed. Removal of the sensor retaining nut must be regarded as sensor removal. The valve cap must always be in place except when inflating, releasing pressure or checking pressure.

1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Remove the wheel and tire.

3.  **CAUTION:** To avoid damage to the tire low pressure sensor, release the tire bead from the rim, 180 degrees from the valve.

Remove the tire from the wheel.

4. CAUTIONS:

-  Do not push on the valve.

-  If the tire low pressure sensor is to be re-installed, a new washer, seal and nut must be installed.

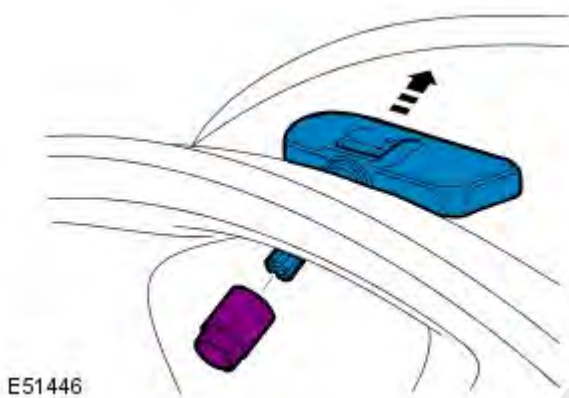
-  If the tire low pressure sensor is to be re-installed, a new washer, seal, nut and silver coloured nickel valve core must be installed.

Remove the tire low pressure sensor.

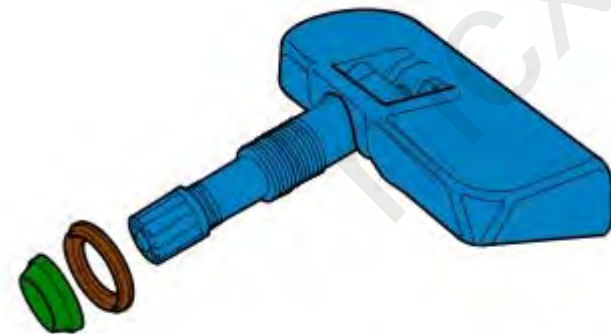
- Remove the nut.
- Release and withdraw the sensor along the valve axis.

5. If necessary, install a new seal and washer.

- Remove and discard the seal and washer.
- Install a new washer and seal, making sure the valve remains pressed fully onto its seat.



E51446



E51447

Installation

1.  **CAUTION:** Do not use compressed air to clean the sensor. Do not clean the sensor with solvents or cleaning agents of any type, use a clean dry cloth.

Clean the component mating faces.



E51449

2.  **CAUTION:** Do not apply any lubricant to the new valve.

• **NOTE:** If the sensor is replaced on a 'running' wheel, the new sensor identification will be learnt when the vehicle is first driven. If a new sensor is fitted to the spare wheel the identification for that sensor must be programmed into the Tire Pressure Monitoring System (TPMS) module using T4. The identification code is provided on a label with the complete assembly and is also printed on the casing of each sensor.

Install the tire low pressure sensor.

- Install and hand tighten the nut whilst keeping the sensor in place.
- Tighten the nut to 6.5 Nm (4.8 lb.ft).

3. Install the tire and balance the wheel.

4. Install the wheel and tire.

- Tighten the wheel nuts to 140 Nm (103 lb.ft).

Wheels and Tires - Tire Pressure Monitoring System (TPMS) Front Antenna

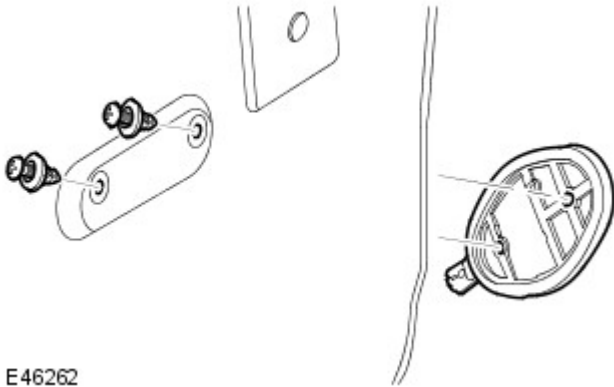
Removal and Installation

Removal

1.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

2. Remove the fender splash shield.
For additional information, refer to: [Fender Splash Shield](#) (501-02 Front End Body Panels, Removal and Installation).
3. Remove the tire pressure antenna.
 - Remove the 2 retainers.



E46262

Installation

1. To install, reverse the removal procedure.
2. Initiate a new tire pressure antenna using T4.

Wheels and Tires - Tire Pressure Monitoring System (TPMS) Rear Antenna

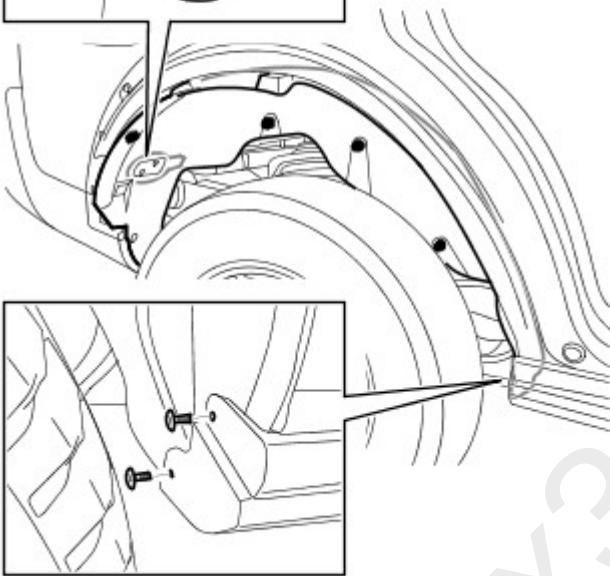
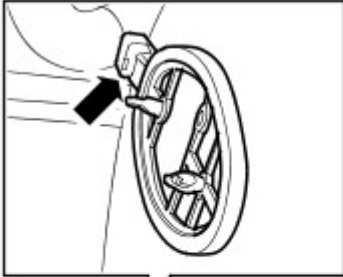
Removal and Installation

Removal

1. Remove the fender moulding.
For additional information, refer to: [Rear Quarter Panel Moulding](#) (501-08 Exterior Trim and Oramentation, Removal and Installation).

2. Remove the fender splash shield.

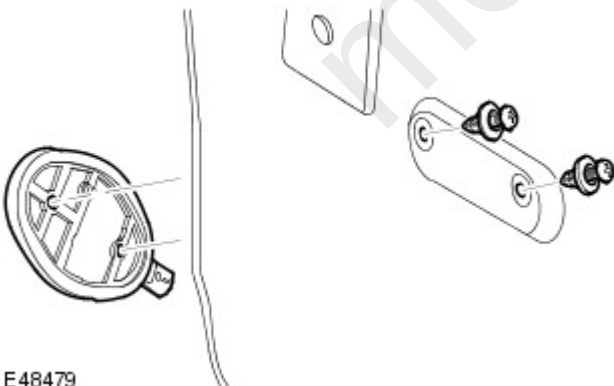
- Remove the 2 screws.
- Remove the 6 retainers.
- Disconnect the electrical connector.



E48478

3. Remove the tire pressure antenna.

- Remove the 2 retainers.



E48479

Installation

1. To install, reverse the removal procedure.
2. Initiate a new tire pressure antenna using T4.